CHAPTER 29

GROUNDING

29-1. Minimum maintenance activities for grounding systems

The tables located at the end of this chapter indicate items that must be performed to maintain systems and equipment at a minimum level of operational readiness. The listed minimum action items should be supplemented by manufacturer-recommended maintenance activities and procedures for specific pieces of equipment. Maintenance actions included in this chapter are summarized in table 29-1.

29-2. General maintenance procedures for grounding systems

Proper grounding provides personnel safety, affords effective equipment operation, and in some cases enables important shielding requirements. This section covers the requirements to maintain good grounds.

a. Review maintenance records. Personnel should review past maintenance records to find repair patterns. These records may point to certain components that should be closely inspected during performance of preventive maintenance.

b. Review operator records. Review operator records for items pertaining to the grounding system.

c. Equipment inspection. Perform a general inspection of the grounding system as described below.

(1) Inspect conductors for damage.

(2) Inspect electrical connections for degradation. Repair as required.

(3) Inspect electrical insulation for discoloration and degradation. Repair as required.

(4) Inspect for loose grounding connections. Tighten as required.

(5) Inspect for proper connection of system ground.

d. Clean equipment. Remove debris, dirt, and other foreign objects from all components and areas within resistor and reactor equipment.

e. Tighten grounding connections. All accessible grounding connections should be torqued to the proper design value.

f. Earth electrode measurements. Measure ground impedance utilizing the fall-of-potential method per American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) 81, "IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System." A practical application of the fall-of-potential method is described in paragraph 2.2.2.2.1 of MIL-HDBK-419A, Volume 2, Grounding, Bonding, and Shielding for Electronic Equipment and Facilities. For large systems with several grounding electrodes where the above measurements are not

practical, perform ground impedance measurements using the intersecting curves method or the slope method described in references 40 and 41 in IEEE 81.

g. Equipment ground measurements. Perform equipment ground measurements in accordance with the following.

(1) Measure critical equipment ground impedance using the two-point method of IEEE 81.

(2) Measure stray currents using a true rms ammeter. Eliminate these to the extent possible.

(3) Measure critical grounding bond resistances using test procedures described in paragraph 2.2.2.3 of MIL-HDBK-419A, Volume 2.

h. Signal reference subsystem measurements. Perform signal reference subsystem measurements in accordance with the following.

(1) Measure bond resistance in accordance with paragraph 2.2.2.3.1 of MIL-HDBK-419A, Volume 2.

(2) Measure noise current in accordance with paragraph 2.2.2.3.2 of MIL-HDBK-419A, Volume 2.

(3) Measure differential noise voltage in accordance with paragraph 2.2.2.3.3 of MIL-HDBK-419A, Volume 2.

Table 29-1. Grounding

Grounding	
Action	***Frequency***
WARNING! MAINTENANCE PERSONNEL SHALL LOCKOUT/TAG EQUIPMENT TO ENSURE DE-ENERGIZATION DURING MAINTENANCE PROCEDURES.	
Review maintenance records.	yr
Review operator records.	yr
Inspect grounding system for the following.	
Inspect conductors for damage.	yr
Inspect electrical connections for degradation. Repair as required.	yr
Inspect electrical insulation for discoloration and degradation. Repair as required.	yr
Inspect for loose grounding connections. Tighten as required.	yr
Inspect for proper connection of system ground.	yr
Clean equipment.	yr
Tighten grounding connections.	yr
Earth electrode measurements.	
Measure ground impedance using the fall-of-potential method. For large systems consider using the intersecting curves method or the slope method. (Reference 29-2*f*)	
Equipment ground measurements.	
Measure critical equipment ground impedance using the two-point method of IEEE 81.	yr
Measure stray currents using a true rms ammeter. Eliminate these to the extent possible.	yr
Measure critical grounding bond resistances. [Reference 29-2*g(3)*]	yr
Signal reference subsystem measurements.	
Measure bond resistance. [Reference 29-2*h(1)*]	yr
Measure noise current. [Reference 29-2*h(2)*]	yr
Measure differential noise voltage. [Reference 29-2*h(3)*]	yr